

(12) UK Patent Application (19) GB (11) 2 150 335 A

(43) Application published 26 Jun 1985

(21) Application No 8331007

(22) Date of filing 21 Nov 1983

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(51) INT CL⁴
G07F 17/34

(52) Domestic classification
G4V 118 AA
U1S 1174 G4V

(56) Documents cited
GB A 2068620
GB A 2067810
GB A 2052823
EP A2 0081981

(58) Field of search
G4V

(54) Gaming machines

(57) An image displaying device, suitable for a gaming machine, includes a frame formed by side walls (1, 2), an upper wall (3), a lower wall (4) and a rear wall (5) all secured together by screws. One side wall (1) includes a cut-out opening arranged to receive an inner panel (6) which is secured to one side of a body portion (7), the other side being secured to the other side wall (2). The body portion includes fixed lower (8, 9, 10) and vertically movable upper (12, 13, 14) wheel arrangements around which a continuous flexible band (33) carrying symbols (34) is disposed. The symbols are selected by rotation of a motor (19) via a gearing arrangement (20, 21) and photocells (25, 26) identifying which of the symbols is being or is to be displayed.

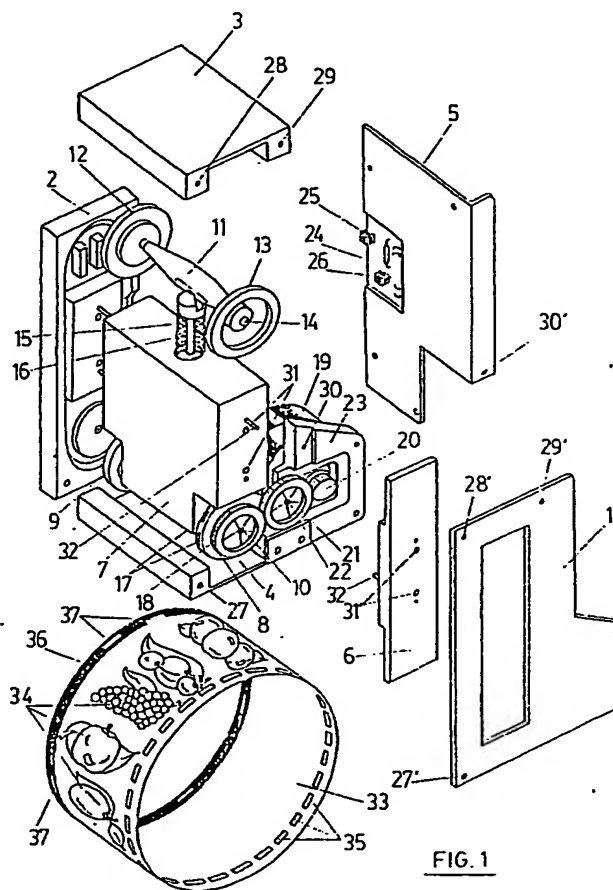


FIG. 1

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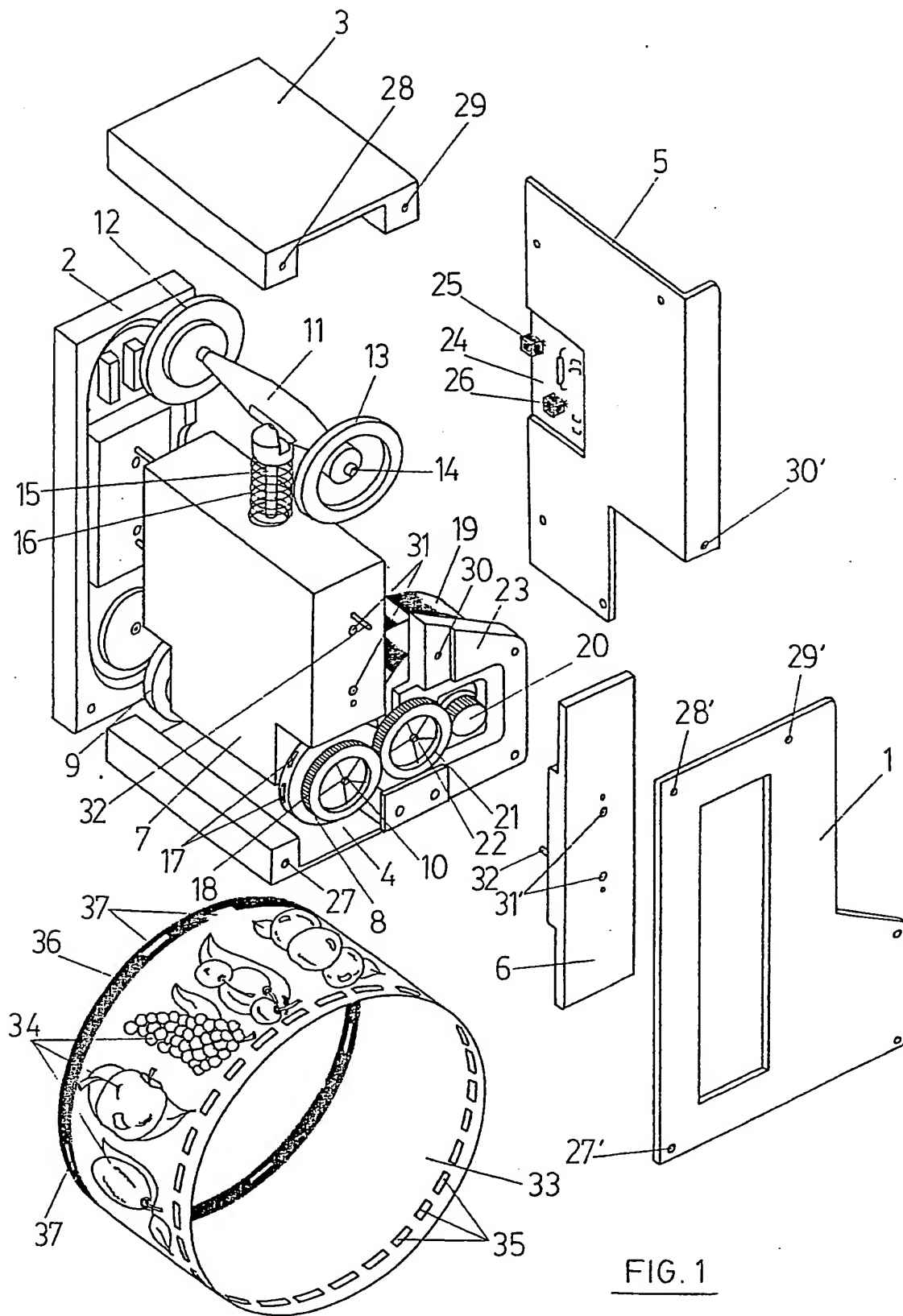


FIG. 1

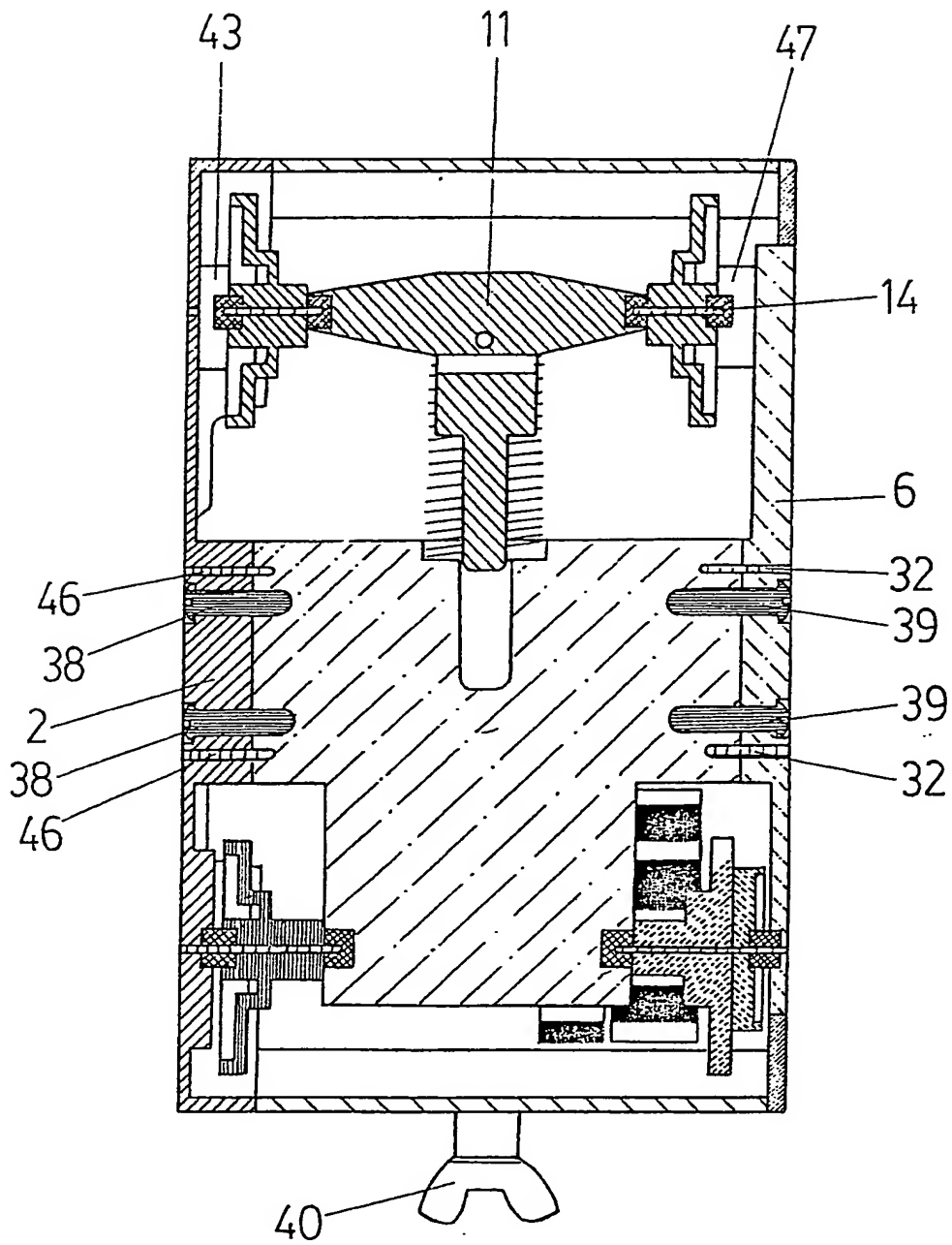
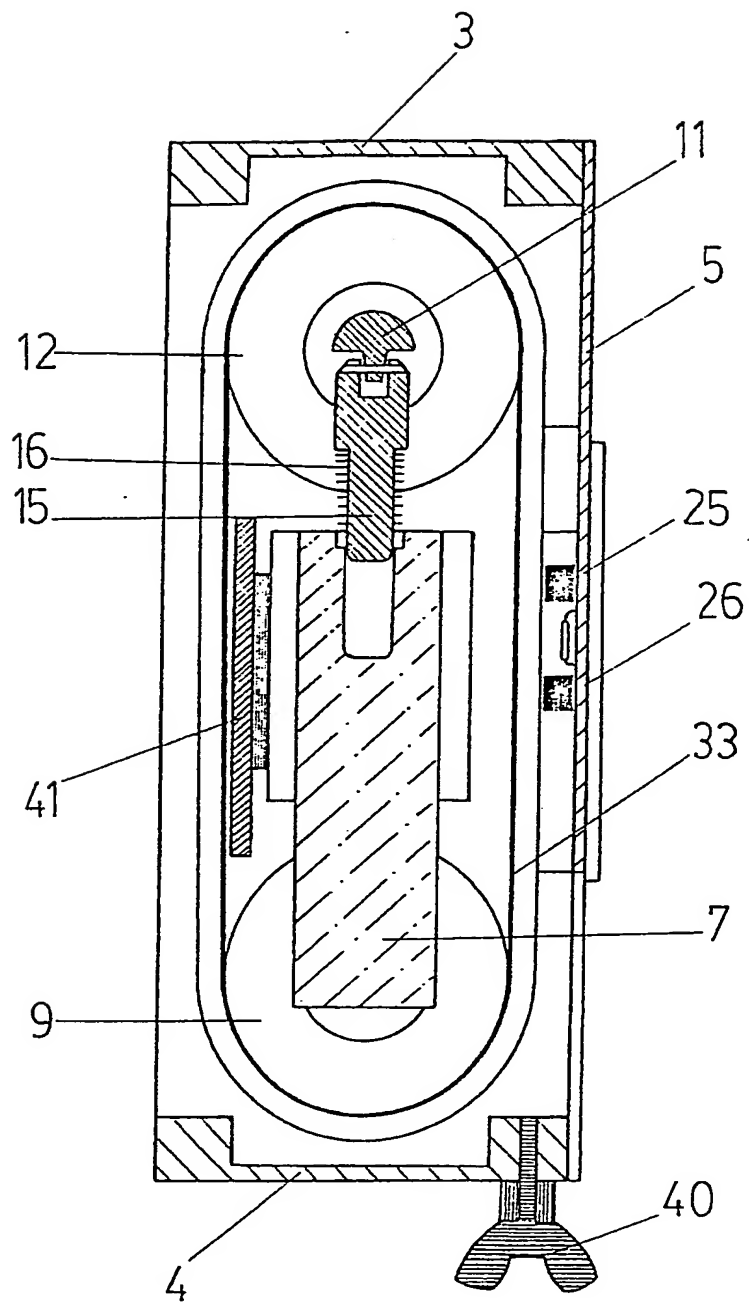


FIG. 2

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FIG. 3

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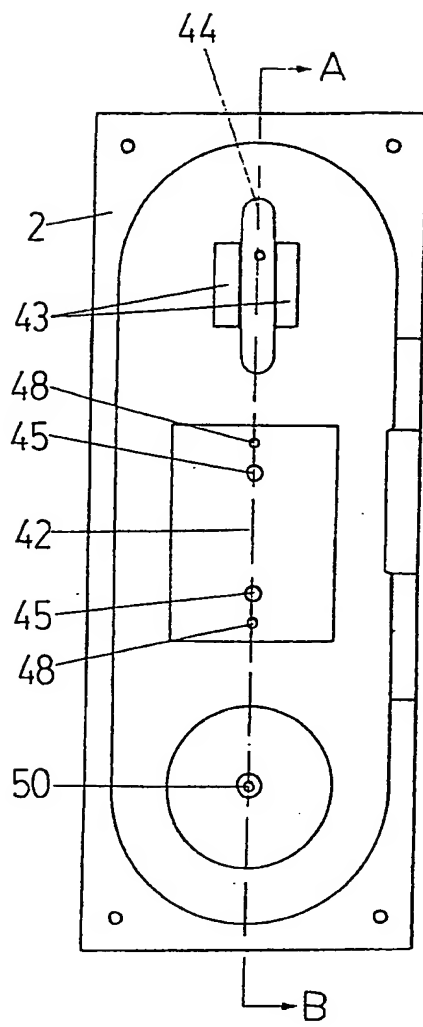


FIG. 4

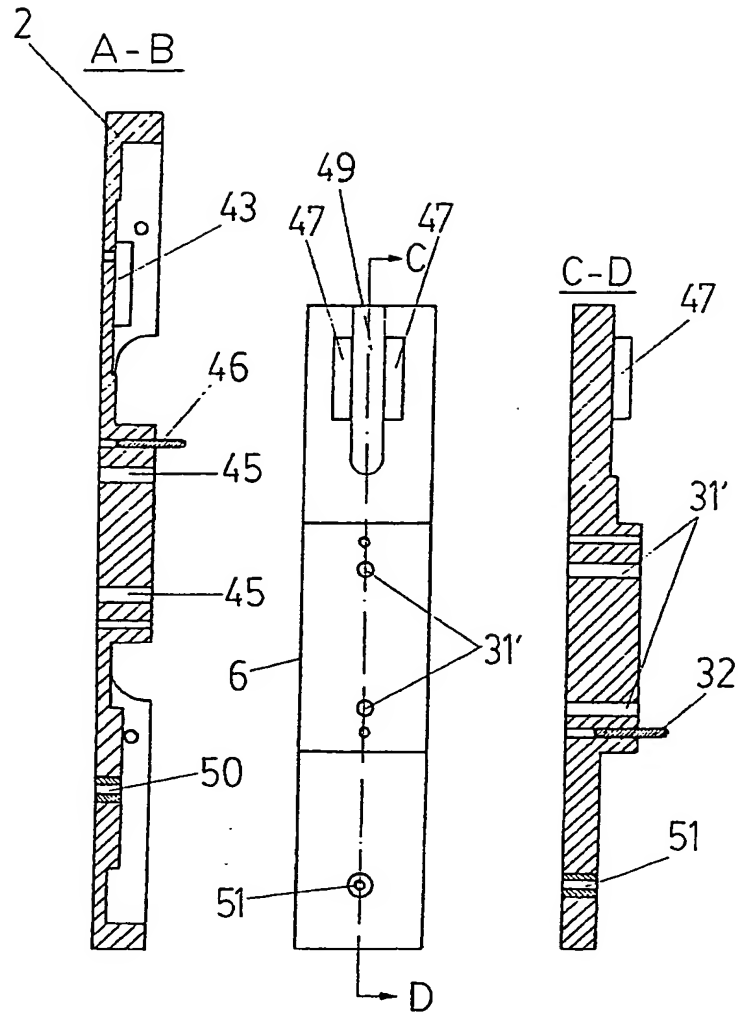
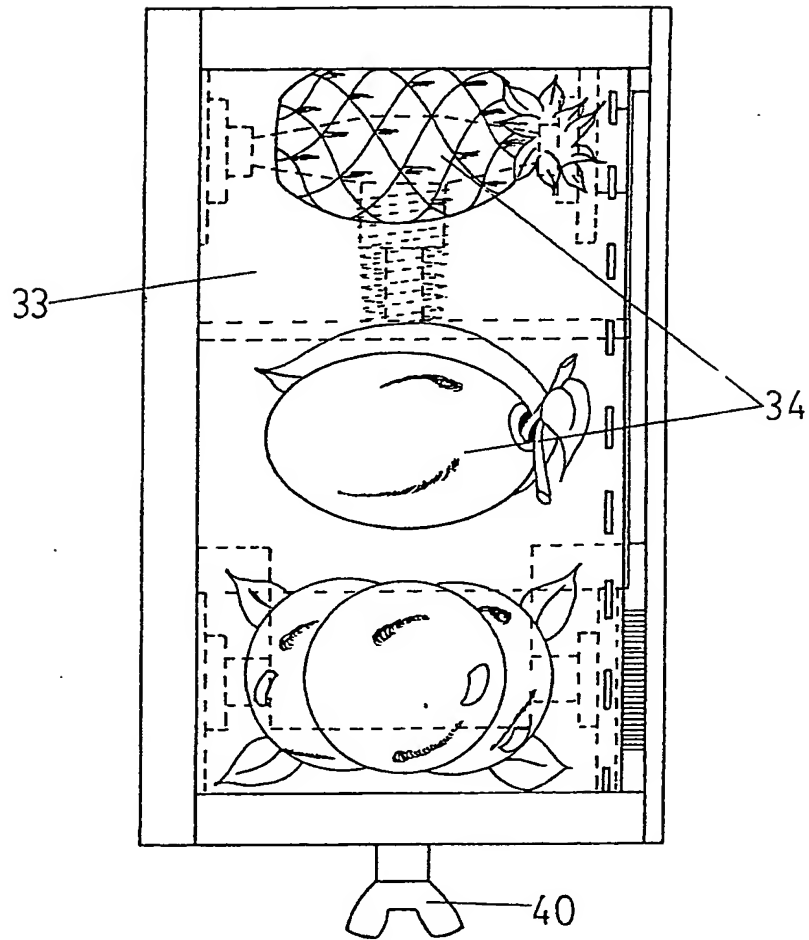


FIG. 5

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FIG. 6

SPECIFICATION

A device for selectively displaying images

5 This invention relates to a device for selectively displaying images, and is particularly suitable for recreational or gaming images which give cash prizes.

Various types of recreational or gaming machines are known in which, after inserting a coin or token, a set of mechanisms are actuated and present to the viewer a series of images consisting of figures, signs or symbols. The mechanisms determine the formation of different combinations of images, some of which have been assigned different prizes which the machine awards the player when the corresponding combination is obtained. One example is the so-called "fruit machine" in which three or more sets of fruit symbols are selectively displayed, prizes being given for particular combinations.

In order that the machine may develop the game cycle, it is necessary that it includes, apart from the mechanisms that display the images, means which identify the final combination obtained, as well as means which actuate the mechanisms which award the prize corresponding to the combination that is obtained.

The images are displayed to the player in different forms, depending on the type of machine, through windows in the front part of the machine. Thus, in certain types, the images are supported or engraved on the peripheral surface of rotatable rollers positioned vertically; alternatively, the machines may incorporate appropriate projectors which, through suitable lenses, project the images on said windows; images may also be formed by means of optical fibres, when selected fibres are illuminated in accordance with the images which are desired to be obtained, at the opposite ends to those appearing to the viewer.

The above procedures for the display of images in this type of machine require a series of mechanical and/or electric and/or optical elements which need careful and skillful assembly and are also expensive to manufacture, resulting in high cost. Furthermore, in the aforesaid cases, the images displayed to the viewer are usually reduced in size, which undoubtedly decreases the viewer's interest towards the machine.

The present invention provides a device for selectively displaying images, comprising a frame formed by first and second side walls, an upper wall, a lower wall and a rear wall, each of said walls being formed separately and secured to adjacent walls by securing means, the first side wall having an opening arranged to receive an inner panel, the device further comprising a body portion secured to the second side wall and carrying a fixed lower wheel arrangement including two wheels supported by a common axle and a movable upper wheel arrangement including two wheels supported by a common axle, the upper and lower wheel arrangements supporting a continuous flexible band which carries the images to be displayed,

whereby the images are selected by rotation of the wheel arrangements and consequent movement of the continuous band.

The preferred construction of the present invention provides a simple, reliable, functional device, with a discrete number of elements, which result in cheap and minor maintenance.

The preferred device displays the images on a continuous band of adequate width, which permits using to advantage almost the whole width of the band (except two narrow marginal strips) for the display and/or support of the different symbols. In this manner, the images can be seen directly by the viewer from the band carrying the images, without the need for lenses or other intermediate elements. This also facilitates the arrangement and positioning of the lighting means for the symbols, since said lighting may be carried out in the front part. On one of the margins, the band preferably incorporates the necessary information so that corresponding identifying means may at all times identify the image positioned in front of the player, whereas on the opposite margin the band may include a series of perforations evenly spaced out for driving the band by a sprocketed wheel.

The device has been designed preferably on the basis of a box or frame with a generally prismatic shape. The box is open frontally, that is, it does not have a front wall, and it is through this opening that the viewer sees the different symbols displayed on the continuous band.

The various walls are fastened to their respective adjacent walls preferably by means of screws. Likewise, the central body portion containing the driving and tensioning mechanisms of the band is secured on one side to a side wall preferably by means of screws and, on the other, to the inner panel arranged to fit in the opening of the other side wall. In this manner, by unscrewing the corresponding side wall, it is possible to remove the set of internal mechanisms without having to unscrew all of the walls.

In the preferred device, a small motor, secured to the lower wall, may or may not be equipped with speed reducer means as required, and provides movement to the driving mechanism of the continuous band. Likewise, a printed circuit board is secured to the rear wall facing the interior of the box and carries photoelectric cells used as identification means for identifying the image or symbol to be displayed.

The support body portion of the driving means for the band has a lower wheel arrangement, formed by two parallel wheels supported by a fixed axle, one on either side of the body, and an upper wheel arrangement, also on either side of the body and aligned vertically with the lower one, supported by a movable axle. One of the lower wheels has rectangular evenly-spaced projections about its periphery, for insertion thereof in the perforations provided on the continuous band. Additionally, fixedly attached to this same lower wheel, a toothed wheel of lesser diameter than the former has been provided, by means of which the lower wheel arrangement receives drive from the motor.

As previously mentioned, the upper wheel arrangement is vertically movable, a spring urging it outwardly. This ensures tensioning of the driving movement with respect to the lower wheel which performs the driving function. On the side walls, guide grooves have been provided for guiding both ends of the upper axle of the wheel arrangement in order to keep the wheel arrangement, in view of the possibility of its movement and vertical displacement, from adopting a position that may cause malfunctioning of the device.

In a recreational or gaming machine, three or more of the devices will be provided, preferably aligned horizontally.

The invention will become more readily understood from the following detailed description of a preferred embodiment, when read in conjunction with the accompanying drawings which illustrate the embodiment by way of example and in which:-

Figure 1 is a partial detail view of the preferred device for displaying images;

Figure 2 is a vertical sectional view of the device shown in *Figure 1*, along a plane parallel to the rear wall;

Figure 3 is a vertical sectional view of the device shown in *Figure 1*, along a plane parallel to the side walls;

Figure 4 illustrates corresponding elevational and sectional views A-B of a side wall of the device shown in *Figure 1*;

Figure 5 illustrates corresponding elevational and sectional views C-D of the wall section opposite to the side wall depicted in *Figure 4*; and

Figure 6 is a front view of the device shown in *Figures 1* to *5*, when assembled.

Referring initially to *Figure 1* of the drawings, there is shown a partial detail view of a device for selectively displaying images, illustrating the different elements comprising the same. Shown therein

are side walls 1 and 2, an upper wall 3, a lower wall 4 and a rear wall 5. The side wall 1 includes an opening which is arranged to receive an inner panel 6 fitting within the opening. Secured to the side wall 2, preferably by means of screws (as will be seen hereinafter with respect to *Figure 2*), a body portion 7 includes a lower wheel arrangement, constituted by wheels 8 and 9 secured to an axle 10, as well as an upper wheel arrangement comprising wheels 12 and 13 secured to an axle 14. Said upper wheel arrangement 11 is jointed to the head of a stem or slide member 15 which is located in a hole cut out in the body portion 7, driven outwardly by the action of a spring 16. With this construction of upper wheel arrangement 11, it will be understood that the same may move in a vertical direction under the action of said spring 16, pivot on either side in view of the jointing thereof to the head of the stem 15, rotate in a horizontal plane with respect to the longitudinal axle of said stem, or combine all the aforesaid movements. The lower wheel 8 has projections 17 evenly distributed about its periphery and backed integrally to its external face and attached to the same axle 10, it has a toothed wheel 18 to which movement is communicated from the motor 19 by

means of intermediate toothed wheels 20 and 21 of which the toothed wheel 20 has been conveniently secured to the rotatable axle of said motor 19. Likewise, the toothed wheel 21 is supported by an axle 22 with respect to which it may rotate.

The lower wall 4 has a rear extension 23 to which the motor 19 has been secured by suitable means. In the rear wall 5, a sufficient portion has been cut away in order to adapt said wall to the position of the aforesaid motor 19.

In *Figure 1*, it can also be observed that the rear wall 5 includes a printed circuit board 24, secured thereto preferably by means of screws (not shown herein), and which supports photoelectric cells 25 and 26. Said photoelectric cells constitute the identification means of the images which are displayed by the device, and of these, cell 26 will preferably be used as a reference indicator or "passage through zero" indicating a single reference point, whereas cell 25 will be used preferably for counting the passage of images starting from the former reference point and therefore providing proper identification of the images displayed.

The upper 3 and lower 4 walls have thickened front and rear edges and are provided with internally threaded orifices on both sides, such as those designated by reference numerals 27, 28 and 29, with positions coinciding with the orifices 27', 28' and 29' of the side wall 1, so that securing of the aforesaid walls is carried out relative to each other by means of screws. In the same manner, the side wall 2 is secured to the upper 3 and lower 4 walls, whereas the rear wall 5 is secured to the upper 3, lower 4 and side 2 walls, by means of corresponding orifices, as well as to the rear extension 23 by means of the threaded orifice 30 and the corresponding one 30' of said rear wall.

Lastly, the body portion 7 is provided with side orifices 31, internally threaded, at positions coinciding with the orifices 31' of the part of wall 6, for the securing of said part of wall to the aforesaid body portion 7. Furthermore, other orifices have been provided both in the body portion 7 and in the part of wall 6, also in coincident positions, wherein are inserted bolts 32, which properly position the part of wall 6 with respect to the body portion 7 even without securing screws of both elements.

A continuous flexible band 33 is made of transparent flexible material and on its external surface it shows images such as symbols 34 depicted in *Figure 1*. Said symbols 34 may be printed on the band or may consist simply of images adhered to the external face of the continuous band 33. Along one of the edges of the continuous band 33 have been cut a plurality of perforations 35 evenly distributed throughout its length, whereas the opposite marginal zone or edge 36 is blackened so as to provide the necessary means to facilitate position information of the images to the aforesaid photoelectric cells 25 and 26. These information providing means may consist, for example, of simple unblackened segments 37, conveniently distributed throughout the aforesaid zone 36.

Figure 2 illustrates a vertical section only by

means of screws 38 and to the inner panel 6 fitting in the side wall by means of screws 39.

In Figure 2 the position of each component is also seen, as well as the housing of the ends of the axle 14 of the upper wheel arrangement 11 in vertically guided grooves provided on the side wall 2 and in the inner panel 6, although this arrangement of grooves may be seen in detail in Figures 4 and 5, and will be commented on hereinafter. In Figure 2, it can also be seen that the set has conventional means such as a wing nut and bolt 40 for the securing thereof to the chassis of the machine.

Figure 3 illustrates a vertical sectional view of the device along an intermediate plane parallel to the side walls. In this case, the continuous band 33 is already positioned and supported by the wheels of both upper and lower wheel arrangements of which the lower wheel 9 and the upper wheel 12 can be seen. It is also seen that the bias of the spring 16 urges the upper wheel arrangement 11 outwardly and thereby tensions said continuous band.

In Figure 3, it is further observed that the body portion 7 has been provided on its front face with a smooth plate 41 conveniently secured to said body portion. The aforesaid plate will be opaque and of a reflective clear colour, or at least its front surface will be white so as to provide the illuminated symbol with more clarity and emphasis.

Referring now to Figure 4, shown therein are corresponding elevational and sectional views A-B of the side wall 2 of the device. Both illustrations clearly show the general form of said side wall 2 in the interior of which has been made a cut-away which affects most of its surface, determining a central nucleus 42 of a generally rectangular shape, as well as two parallel and spaced-apart upper elevations 43, between which has been provided a slightly recessed longitudinal zone 44.

The central nucleus 42 includes orifices 45 through which screws 38 are inserted for securing of the nucleus (see Figure 2), and it also has other orifices 48 of lesser diameter in which are positioned studs 46 which correctly position the body portion 7 with respect to the side wall 2, independently of whether or not both body portion 7 and wall 2 have been secured therebetween by means of the corresponding screws.

Figure 5 illustrates corresponding elevational and sectional views C-D of the inner panel 6. The inner panel has interior parallel spaced apart elevations 47 in positions facing each other and corresponding to those of the side wall 2, and between the elevations 47, a slightly recessed longitudinal zone 49.

The orifices 50 and 51 provided respectively on the side wall 2 and on the inner panel 6 are used to house the ends of the axle 10 of the lower wheel arrangement. The grooves determined by the parallel elevations 43 of the side wall 2 and by the parallel elevations 47 of the inner panel 6 prevent lateral movement of the upper wheel arrangement 11 and limit movement to the vertical direction only. Due to this vertical movement of the upper wheel arrangement 11, it is possible to

absorb the manufacturing tolerances of the continuous band 33, the permanent deformations of the continuous band, or even permit the use of continuous bands of different sizes.

Figure 6 illustrates a front elevational view of the assembled device. On its open front part are shown the symbols 34 contained in the continuous band 33 and displayed to the viewer.

Since the device as shown in Figure 6 allows observation of more than one symbol on the part of the viewer, this leads to the possibility of forming combinations of symbols in different ways. Thus, in a machine that has, for example, three such devices as stated hereinabove, preferably aligned in the horizontal direction, and in each one of which three symbols are displayed to the viewer, combinations may be formed with the upper symbols, with the central symbols, with the lower symbols and/or with the symbols which coincide along on or other diagonal.

CLAIMS

1. A device for selectively displaying images, comprising a frame formed by first and second side walls, an upper wall, a lower wall and a rear wall, each of said walls being formed separately and secured to adjacent walls by securing means, the first side wall having an opening arranged to receive an inner panel, the device further comprising a body portion secured to the second side wall and carrying a fixed lower wheel arrangement including two wheels supported by a common axle and a movable upper wheel arrangement including two wheels supported by a common axle, the upper and lower wheel arrangements supported by a common axle, the upper and lower wheel arrangements supporting a continuous flexible band which carries the images to be displayed, whereby the images are selected by rotation of the wheel arrangements and consequent movement of the continuous band.

2. A device according to claim 1, wherein the upper wheel arrangement is mounted on the end of a slide member disposed for sliding movement within a corresponding orifice of the body portion, a spring being arranged to urge the slide member and hence the upper wheel arrangement upwardly.

3. A device according to claim 1 or claim 2, wherein a wheel of the lower wheel arrangement acts as a drive wheel for the continuous band and is provided with projections of rectangular section evenly distributed about its periphery, which projections engage with perforations provided along the corresponding edge of the continuous band, the drive wheel being coupled via a gearing arrangement to an electric motor secured to a rear extension of the lower wall.

4. A device according to claim 1, claim 2 or claim 3, wherein the body portion is secured to the second side wall and to the inner panel by means of positioning bolts and which is secured on both sides preferably by means of screws.

5. A device according to any of the preceding claims, wherein both ends of the axle of the upper

wheel arrangement are housed in corresponding grooves constituted by respective parallel and spaced-apart elevations provided on the second wall and on the inner panel, so as to constrain movement of the upper wheel arrangement to a vertical direction.

6. A device according to any one of the preceding claims, further including a printed circuit board mounted on the rear wall which includes identification means for identifying the images displayed at each moment, the identification means comprising a first detector for detecting a reference signal indicative of a particular reference point on the continuous band and a second detector arranged to count the images on the continuous band as they pass for identification thereof.

7. A device according to claim 6, wherein the first and second detectors comprise first and second photoelectric cells.

8. A device according to claim 6 or 7 as dependent on claim 3, wherein the reference signal indicative of the reference point on the continuous band is detected along the edge of the continuous band opposite to that having the perforations.

9. A device according to any one of the preceding claims, wherein the securing means for the walls are screws.

10. A device according to any one of the preceding claims, wherein the images carried by the continuous band may be printed thereon or adhered to its external surface.

11. A device according to any one of the preceding claims, provided in a recreational or gaming machine.

12. A device for selectively displaying images, substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.